IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT(S):	Ishigami et al.	DOCKET NO.: 09792909-5322
SERIAL NO.:	To be assigned	GROUP ART UNIT: 2612
DATE FILED:	December 22, 1997	EXAMINER: Tillery, R.
INVENTION:	"CHARGE TRANSFER DEVICE AND METHOD OF DRIVING THE SAME, AND SOLID-STATE IMAGING DEVICE AND METHOD OF DRIVING THE SAME"	

January 22, 2002

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

PRELIMINARY AMENDMENT

The Preliminary Amendment is being filed with a divisional application of parent application 08/996,313, entitled "CHARGE TRANSFER DEVICE AND METHOD OF DRIVING THE SAME, AND SOLID-STATE IMAGING DEVICE AND METHOD OF DRIVING THE SAME" filed on December 22, 1997. Applicants seek to prosecute claims 1, 3-5, 7, 8, and new claims 24-25 in the present Divisional Patent Application. Applicants are amending claims independent claims 1 and 5. Applicants are including a clean copy of the amended claims along with a clean copy of the other claims that are being prosecuted in the Divisional Patent Application. Please enter the following amendments and consider the identified Divisional Patent Application in view of these amendments and remarks. Applicants believe that no new matter has been added by this amendment. Further, in the prior response to an Office Action in the parent case, Applicant left out the word "no" when explaining that

Applicants believed that NO new matter was added by the claim amendments or in the application.

In The Specification

Applicants are amending the specification to include information about the parent application. A clean copy of the amended paragraph is included with this Preliminary Amendment. The new paragraph is as follows and is inserted before the heading Field of the Invention:

Related Applications

This application is a divisional of application number 08/996,313, filed December 22, 1997.

In The Claims

Applicants have included with this Preliminary Amendment a clean copy of the amended claims and the claims that are pending in this Divisional Patent Application. Please accept the following amendments to the claims:

1(Amended). A charge transfer device having a charge transfer portion in which a plurality of electrode pairs are formed above a transfer channel, comprising:

means for commonly wiring said plurality of electrode pairs forming N (N=2, 3, 4, ... natural numbers) bits of said charge transfer portion so that electrode pairs of each half bit can be independently driven at every N bits;

means for, in a normal operation, inputting said electrode pairs of each half bit with the same drive pulse having a phase to operate it by a two-phase complementary drive; and

means for, in an N-time speed operation, inputting said electrode pairs of N bits with N pairs of complementary drive pulses to operate them by a 2N-phase complementary drive, wherein the N pairs of complementary drive pulses applied to an electrode pair of said electrode pairs at a last stage of said charge transfer portion has a similar phase as a reset gate pulse and as said phase in said normal operation.

5(Amended). A method of driving a charge transfer device having a charge transfer portion in which a plurality of electrode pairs are formed above a transfer channel and arranged such that said plurality of electrode pairs forming N (N=2, 3, 4, ... natural numbers) bits of said charge transfer portion are wired so that electrode pairs of each half bit can be independently driven at every N bits, comprising the steps of:

in a normal operation, inputting said electrode pairs of each half bit with the same drive pulse having a phase to operate it by a two-phase complementary drive; and

in an N-time speed operation, inputting said electrode pairs of N bits with N pairs of complementary drive pulses to operate them by a 2N-phase complementary drive, wherein the N pairs of complementary drive pulses applied to an electrode pair of said electrode pairs at a last stage of said charge transfer portion has a similar phase as a reset gate pulse and as said phase in said normal operation.

24. (New) A charge transfer device according to claim 1, wherein the last stage of said transfer portion is disposed adjacent to a floating diffusion region.

25. (New) A driving method according to claim 5, wherein the last stage of said charge transfer portion is disposed adjacent to a floating diffusion region.

REMARKS

Claims 1, 3-5, 7, 8 and new claims 24-25 are pending in the present application as amended. Applicants have amended independent claims 1 and 5 without adding any new matter. Consequently, Applicants respectfully submit claims 1, 3-5, 7, 8 and new claims 24-25 are in a condition for allowance.

Response to Rejections in Parent Application

The Examiner rejected claims 1 and 5 under 35 U.S.C §102 as being anticipated by Smith et al (US 4347656). Applicants have amended independent claims 1 and 5 to require the phases of the reset gate pulse and the pulse applied to the electrode pairs a t the last stage of the charge transfer portion to be similar. This claim limitation is not taught or described in the Smith patent. Therefore, not all amended claim limitations are taught by the cited reference and independent claims 1 and 5 are allowable. Further, claims 3-4, 7, 8, 24, and 25 that depend from allowable independent claims and are also allowable.

Thus, claims 1, 3-5, 7, 8, 24, and 25 are in condition for allowance

Conclusion

In view of the foregoing amendment, Applicants respectfully submit that claims 1, 3-5, 7, 8, 24, and 25 are in a condition for allowance, which such action is earnestly solicited.

Respectfully submitted,
Ishigami et al.

By: [signature] Reg. 44,138

Gregory B. Gulliver
Phone: (312) 876-3425
Fax: (312) 876-7934

Sonnenschein Nath & Rosenthal
P.O. Box #061080
Wacker Drive Station
Chicago, Illinois 60606-1080

Clean Copy of Amended Paragraphs in the Specification

Please insert the following heading and paragraph after the heading "background of the invention."

Related Applications

This application is a divisional of application number 08/996,313, filed December 22, 1997.

Clean Copy of the Claims

1(Amended). A charge transfer device having a charge transfer portion in which a plurality of electrode pairs are formed above a transfer channel, comprising:

means for commonly wiring said plurality of electrode pairs forming N (N=2, 3, 4, ... natural numbers) bits of said charge transfer portion so that electrode pairs of each half bit can be independently driven at every N bits;

means for, in a normal operation, inputting said electrode pairs of each half bit with the same drive pulse having a phase to operate it by a two-phase complementary drive; and

means for, in an N-time speed operation, inputting said electrode pairs of N bits with N pairs of complementary drive pulses to operate them by a 2N-phase complementary drive, wherein the N pairs of complementary drive pulses applied to an electrode pair of said electrode pairs at a last stage of said charge transfer portion has a similar phase as a reset gate pulse and as said phase in said normal operation.

3. A charge transfer device according to claim 1, wherein said charge transfer portion is a horizontal transfer portion, a read out gate between vertical charge transfer portions corresponding to respective light receiving portion columns can be driven at one to N columns, in said normal operation all of said read out gates are set on to read a signal, and in said N-times speed operation only one of said N-column read out gates is set on to read a signal of 1/N columns.

4. A charge transfer device according to claim 1, further comprising:

a drain region provided under said horizontal charge transfer portion for draining charges through a gate portion, wherein in said N-time speed operation said gate portion is set on during a horizontal blanking period, signal charges corresponding to (N-1) columns of N columns of light receiving portions are drained to said drain region and then charges are transferred by said charge transfer portion.

5(Amended). A method of driving a charge transfer device having a charge transfer portion in which a plurality of electrode pairs are formed above a transfer channel and arranged such that said plurality of electrode pairs forming N (N=2, 3, 4, ... natural numbers) bits of said charge transfer portion are wired so that electrode pairs of each half bit can be independently driven at every N bits, comprising the steps of:

in a normal operation, inputting said electrode pairs of each half bit with the same drive pulse having a phase to operate it by a two-phase complementary drive; and

in an N-time speed operation, inputting said electrode pairs of N bits with N pairs of complementary drive pulses to operate them by a 2N-phase complementary drive, wherein the N pairs of complementary drive pulses applied to an electrode pair of said electrode pairs at a last stage of said charge transfer portion has a similar phase <u>as a reset gate pulse and</u> as said phase in said normal operation.

7. A driving method according to claim 5, wherein said charge transfer portion is a horizontal transfer portion, a read out gate between vertical charge transfer portions corresponding to respective light receiving portion columns can be driven at one to N columns,

in said normal operation all of said read out gates are set on to read a signal, and in said N-time speed operation only one of said N-column read out gates is set on to read a signal of 1/N columns.

8. A driving method according to claim 5, wherein a drain region is provided under said horizontal charge transfer portion for draining charges through a gate portion, and wherein in said N-time speed operation said gate portion is set on during a horizontal blanking period, signal charges corresponding to (N-1) columns of N columns of light receiving portions are drained to said drain region and then charges are transferred by said charge transfer portion.

24. (New) A charge transfer device according to claim 1, wherein the last stage of said transfer portion is disposed adjacent to a floating diffusion region.

25. (New) A driving method according to claim 5, wherein the last stage of said charge transfer portion is disposed adjacent to a floating diffusion region.